

ABSTRACT OF THE DISCLOSURE

1
2 A semiconductor device having a trench element separation region is disclosed. A
3 pad oxide film (2), and a silicon nitride film (3) may be formed on a semiconductor substrate
4 (1). A trench (4) may be formed by dry etching using the silicon nitride film (3) as a mask.
5 The silicon substrate (1) may be thermally oxidized using the silicon nitride film (3) as an
6 oxidation mask and a modified layer may be formed on the surface of the silicon nitride film
7 (3). The modified layer may be removed by a neutral radical containing fluorine. The
8 surface of the silicon nitride film (3) may be etched by a predetermined thickness. A filling
9 insulation film may be deposited to completely fill the trench (4). The insulation film may
10 then be chemical mechanical polished using the silicon nitride film (3a) as a polishing
11 stopper to form a trench element separation insulation material (8).

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